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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,961	02/25/2004	Hiroki Fujii	2004-0302A	8467

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EXAMINER

RIDDLE, KYLE M

ART UNIT	PAPER NUMBER
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3748

DATE MAILED: 06/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/784,961

Applicant(s)

FUJII ET AL.

Examiner

Kyle M. Riddle

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2005.  
2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 3-7 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 3-7 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.  
10) ☒ The drawing(s) filed on 25 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Response to Amendment***

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art on pages 1 and 2, paragraphs 2-4, of the instant application, in view of Edelmayer et al. (U.S. Patent 5,758,613).

Applicant's admitted prior art discloses a conventional hydraulic lash adjuster comprising:

- a bottomed cylinder fixed to a cylinder head and a plunger accommodated in the cylinder so as to be vertically moved;
- the plunger having an upper end protruding from the cylinder;
- a rocker arm supported on the upper end of the plunger;
- the interior of the plunger serving as a low-pressure chamber;
- a lower interior of the cylinder divided by a bottom wall of the plunger, thereby serving as a high-pressure chamber;
- the bottom wall of the plunger formed with a valve port of a check valve;

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- the low-pressure chamber filled with a hydraulic fluid supplied from a fluid supply passage via communication holes formed in the circumferential walls of the respective cylinder and plunger;

- the high-pressure chamber filled with the hydraulic fluid supplied via the valve port of the check valve;

- a spherical valve element accommodated in the high-pressure chamber and biased in such a direction that it closes the valve port;

- the valve element and valve port constituting a check valve;

- the side of the rocker arm applying a downward pressing force to the plunger closing the valve port by the valve element such that the high-pressure chamber is tightly closed, whereupon the hydraulic fluid filling the high-pressure chamber prevents the plunger from moving downward;

- the plunger moving upward such that the volume of the high-pressure chamber is increased and the pressure reduced, the valve element moving downward relative to the plunger, thereby opening the valve port;

- the hydraulic fluid flowing from the low-pressure chamber into the high-pressure chamber, so that the interior of the high-pressure chamber remains filled with the hydraulic fluid;

- the valve element colliding against a valve seat face of the valve port every time the valve element opens or closes the valve port;

- the valve element is made of a steel having a large specific gravity, for example, SUJZ.

(Page 1 and 2, paragraphs 2-4, specification disclosing prior art conventional lash adjuster).

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Applicant's admitted prior art fails to disclose the valve seat face being convex and arcuate.

Edelmayer et al. teach a hydraulic lash adjuster with a check ball 53 operable to engage a valve seat 55 defined by an arcuate convex curved surface for sealing between two pressure chambers, the contacting portions effectively forming a line or circle when viewed along the axis of the plunger to prevent wedging (column 4, lines 37-41; column 5, lines 27-34; column 6, lines 14-31; Figures 1-3). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Edelmayer et al. in the prior art lash adjuster disclosed by the applicant, since the use thereof would help prevent wedging of the check ball with the valve seat.

3. Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art on pages 1 and 2, paragraphs 2-4, of the instant application, in view of Edelmayer et al., and further in view of Abu et al. (Japanese Patent 58-178812).

Applicant's admitted prior art, as modified by Edelmayer et al., discloses the hydraulic lash adjuster cited above, however, fails to disclose the valve element made of material with a specific gravity less than steel but greater than the surrounding fluid.

Abu et al. teach a hydraulic adjuster with a check ball 7 made of ceramic (see enclosed English translation abstract) and an arcuate valve seat face (see Figures). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Abu et al. in the prior art lash adjuster disclosed by the applicant, as modified by Edelmayer et al., since the use thereof would help prevent the valve seat face from

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wearing and possibly prevent free movement of the valve element by providing a ceramic valve element with a specific gravity between that of steel and the surrounding fluid.

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art on pages 1 and 2, paragraphs 2-4, of the instant application, in view of Edelmayer et al., and further in view of Taniguchi et al. (U.S. Patent 5,185,923).

Applicant's admitted prior art, as modified by Edelmayer et al., discloses the hydraulic lash adjuster with a ceramic valve element having a specific gravity less than steel but greater than the surrounding fluid, however, fails to disclose the valve element made of a ceramic containing silicon nitride.

Taniguchi et al. teach a tappet 400 containing a semi-spherical ceramic portion made of silicon nitride (column 4, lines 15-33). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Taniguchi et al. in the prior art lash adjuster disclosed by the applicant, as modified by Edelmayer et al., since the use thereof would have provided a specific, lighter-than-steel material to help prevent the valve seat face from wearing and possibly prevent free movement of the valve element. Moreover, there is nothing in the record which establishes that the application of such a material in the valve element represents a novel or unexpected result (See *In re Kuhle*, 526 F.2d 553, 188 USPQ 7 (CCPA 1975)).

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being obvious over applicant's admitted prior art on pages 1 and 2, paragraphs 2-4, of the instant application, in view of Edelmayer et al.

Applicant's admitted prior art, as modified by Edelmayer et al., discloses the hydraulic lash adjuster cited above, however, fails to disclose the dual spring elements biasing the valve element.

Applicant's admitted prior art teaches biasing the valve element in such a direction that it closes the valve port (page 1, paragraph 3, lines 1-3 of the paragraph). Single and multiple spring use for biasing ball elements are well known in the art and particularly in tappets and hydraulic lash adjusters, and the inclusion of such would have been a matter of obvious choice.

### ***Response to Arguments***

6. Applicant's arguments filed 20 April 2005 have been fully considered but they are not persuasive.

7. Applicant amended independent claim 3 to include the contacting surface between the check ball and valve seat being of an arcuate convex shape and argues on page 5, middle of the page, that none of the references disclose or teach this limitation. Applicant also argues on page 6, first full paragraph, that it is not well known in the art to use a convex arcuate valve seat. Examiner disagrees. Upon further search, at least three references were found with check balls contacting an arcuate curved surface, including the disclosure taught by Edelmayer et al., above, and the references cited below.

### ***Conclusion***

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of 2 patents.

- Edelmayer (U.S. Patent 5,901,676) discloses a hydraulic lash compensator with a ball contacting an arcuate convex surface.

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- Owen et al. (U.S. Patent 6,439,186) disclose a valve lifter with a ball contacting an arcuate convex surface.

*Communication*

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kyle M. Riddle whose telephone number is (571) 272-4864. The examiner can normally be reached on M-F (07:30-5:00) Second Friday Off.

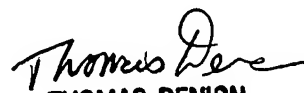
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas Denion can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kyle M. Riddle  
Examiner  
Art Unit 3748

kmr



THOMAS DENION  
SUPERVISORY PATENT EXAMINER  
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